

Report Documentation Page			Form Approved OMB No. 0704-0188	
Public reporting burden for the collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington VA 22202-4302. Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to a penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number.				
1. REPORT DATE <b>27 JAN 2014</b>		2. REPORT TYPE <b>Project Summary</b>		3. DATES COVERED <b>29-07-2013 to 27-01-2014</b>
4. TITLE AND SUBTITLE <b>PORTABLE FUEL QUALITY ANALYZER PROJECT SUMMARY</b>			5a. CONTRACT NUMBER <b>w56hzv-13-c-0296</b>	
			5b. GRANT NUMBER	
			5c. PROGRAM ELEMENT NUMBER	
6. AUTHOR(S) <b>Stuart Farquharson; Smith Wayne; Carl Brouillette</b>			5d. PROJECT NUMBER	
			5e. TASK NUMBER	
			5f. WORK UNIT NUMBER	
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) <b>real-Time Analyzers,362 Industrial Park Road (#8),Middletown,CT,06457</b>			8. PERFORMING ORGANIZATION REPORT NUMBER <b>; #24476</b>	
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES) <b>U.S. Army TARDEC, 6501 E.11 Mile Rd, Warren, MI, 48397-5000</b>			10. SPONSOR/MONITOR'S ACRONYM(S) <b>TARDEC</b>	
			11. SPONSOR/MONITOR'S REPORT NUMBER(S) <b>#24476</b>	
12. DISTRIBUTION/AVAILABILITY STATEMENT <b>Approved for public release; distribution unlimited</b>				
13. SUPPLEMENTARY NOTES				
14. ABSTRACT <b>The overall goal of this Small Business Innovation Research (SBIR) proposed program (through Phase III) is to develop a novel Portable Fuel Quality Analyzer capable of identifying diesel or jet fuels and predicting their performance properties. The Phase I program measured ~100 fuels using both dispersive and FT-near infrared analyzers. These analyzers measure the vibrational modes of the chemical composition of the fuels. This chemical information can be used to identify fuel type and determine performance properties. The Phase I measurements identified the best spectral resolution, spectral region and sample path length to differentiate between diesel and jet fuels, as well as to determine cetane index density, distillation values, flash point, and viscosity. This information will be used to design a prototype during the Phase I Option, which will be built and tested in the Phase II Program.</b>				
15. SUBJECT TERMS				
16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT <b>Same as Report (SAR)</b>	18. NUMBER OF PAGES <b>1</b>
a. REPORT <b>unclassified</b>	b. ABSTRACT <b>unclassified</b>	c. THIS PAGE <b>unclassified</b>		

## Portable Fuel Quality Analyzer

Contract Number: W56HZV-13-C-0296

PI: Dr. Stuart Farquharson (860-635-9800, stu@rta.biz),

Company: Real-Time Analyzers, Inc.

### Project Summary

The overall goal of this Small Business Innovation Research (SBIR) proposed program (through Phase III) is to develop a novel Portable Fuel Quality Analyzer capable of identifying diesel or jet fuels and predicting their performance properties. The Phase I program measured ~100 fuels using both dispersive and FT-near infrared analyzers. These analyzers measure the vibrational modes of the chemical composition of the fuels. This chemical information can be used to identify fuel type and determine performance properties. The Phase I measurements identified the best spectral resolution, spectral region and sample path length to differentiate between diesel and jet fuels, as well as to determine cetane index, density, distillation values, flash point, and viscosity. This information will be used to design a prototype during the Phase I Option, which will be built and tested in the Phase II Program.

The goal of the Phase II program will be to evaluate the ability of two prototype PFQAs to identify diesel or jet fuels and predict their properties. This will be accomplished by building the prototypes, measuring 600 fuel samples, developing and testing comprehensive chemometric models, performing environmental tests, and delivering the prototypes with user friendly software and providing training to US Army personnel.

The Portable Fuel Quality Analyzer will allow Army personnel to quickly determine fuel quality in the field, such as at the point of use. The PFQA can be widely used by all DOD require rapid analysis of fuel quality. This includes the entire shipping industry.

The PFQA will have immediate dual-use at major airports and seaports to rapidly check fuel quality. It could also be used for other transportation industries, such as trucking. The PFQA could also be used in fuel blending operations performed at petroleum, ethanol and biodiesel plants.

